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THE RISK PREMIUM HYPOTHESIS AND TWO-PART TARIFF CONTRACT DESIGN: SOME EMPIRICAL EVIDENCE

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Abstract

The hypothesis that the fixed component of a share contract serves as a risk premium is tested using a sample of contracts from the motion-pictures industry. The evidence refutes the risk-premium hypothesis under a variety of assumptions about the relative risk averseness of the players. Alternative explanations for the role of a fixed payment in two-part tariff contract design are proposed.

The Risk Premium Hypothesis and Two-Part Tariff Contract Design: Some Empirical Evidence

I. INTRODUCTION

What role does the fixed payment play in a two-part tariff contract, comprised of both a fixed and share payment? The risk premium argument suggests that a risk-averse agent will be offered a risk premium, in the form of a fixed payment, to lessen the burden of risk he must bear. Data on contracts between actors and producers in the U.S. motion-pictures industry refute this hypothesis.

Consider the case in which a landowner offers a farmer a contract, or more generally, a principal offers an agent a contract. The compensation scheme, involving a share payment, can be represented as the combination of a fixed payment plus a share of the output (Stiglitz (1974), Hayami and Otsuka (1993)). When the fixed portion equals zero, the agent shares a fraction of the output produced. When the share equals zero, the agent receives a fixed payment. And when the share equals one, and the fixed payment is non-zero, the agent becomes the residual claimant.[1]

Both the sharecropping and the principal-agent literatures have attempted to explain optimal share-contract design when players face threats from both moral hazard and risk-sharing. In the sharecropping literature, monitoring costs vary with the attributes of the land, the nature of the crops, and the expected duration of the contracting relationship.[2] In the principal-agent literature, enforcement costs vary based on the extent to which adverse selection and information asymmetries permeate the contractual relationship.[3] In both literatures, predictions regarding

contract choice depend upon the risk associated with the output, and the relative risk averseness of the landowner and tenant, or of the principal and agent.

Under the usual assumptions, a risk-neutral principal offers a risk-averse agent a contract, which balances the positive incentive effects of tying the agent's payment to the output, against the benefit to the agent of not bearing the entire burden of uncertainty surrounding the output. Recent empirical contract research suggests that moral hazard mitigation can dominate contract design.[4] The present analysis examines a very particular question that may shed light on the explanatory power of the risk-sharing argument in contract design. Using data on combination contracts from the motion-pictures industry, this paper asks specifically: Do fixed components of two-part share contracts, offered by risk-neutral principals, serve as risk premia for risk-averse agents? The evidence suggests that they do not.[5]

Section II documents the data collection process. Section III proposes measures of the riskiness of each film project and refutable hypotheses. Section IV analyzes the empirical results. Section V concludes by offering alternative explanations driving the choice of fixed components of share contracts.

II. DATA DESCRIPTION

The data set used in this analysis is a subsample of a contract data set collected at the Academy of Motion Pictures Arts and Sciences in Beverly Hills. File folders containing compensation information for actors, in the form of clippings from periodicals, were consulted. The sources of the clippings included such periodicals as: *The New York Times, The Wall Street Journal,*

Hollywood Reporter, and *Variety.* Since the focus of the current paper is on a subsample of these contracts, the data description will emphasize the comparison of the subsample to the larger sample.[6]

The subsample is comprised of those share contracts for which a fixed payment was made to the actor, and for which the size of this payment is known.[7] This subsample contains 35 observations. The universe of contracts of the original data set included lead actors and actresses in feature-length films. One concern is that the choice of the subsample may introduce a selection bias. Table 1 provides some of the descriptive statistics pertaining to the background of the actors in the subsample, and compares them to those of the larger sample.[8] Note that these performers provide an essentially representative subsample from the actors in the larger sample. For example, the mix of film genres is similar, as is the representation of sequel films. The most striking difference between the subsample and the sample is the Oscar recognition and experience of the actors; in the subsample, actors with more Oscar recognition and more experience are over-represented. The potential impact of this selection bias on the empirical analysis will be addressed in the section which follows.

III. EMPIRICAL MEASURES OF RISK AND PREDICTIONS

The riskiness of a project centers around the nature of the film under production. Three characteristics of the film proposed to measure its riskiness include: the sequel nature of the film; the genre of the film; and the season in which the film is expected to be released in theaters. Furthermore, the actor's experience may affect the perceived riskiness of a film project. A

discussion of the riskiness of each of these characteristics is presented, and predictions about the expected impact on the size of the fixed payment to the actor follow.

Sequel

If a film is a sequel then, *ex ante,* it will appear to be a less risky project than a film that is the first incarnation of a story. Therefore, a risk-averse actor will not require a large risk premium to undertake the current project. The SEQUEL variable is equal to one if the film is a sequel, and zero otherwise. If the film is a sequel, the real fixed payment received by the actor should be smaller than when the film is not a sequel.

Genre

The genre of the film should matter to a risk-averse actor to the extent to which one film genre is perceived to be more risky than another. Each film in the subsample was placed in one of the following genre categories: ACTION, COMEDY, or DRAMA. Using a separate data source to examine the relationship between film revenues and genre, coefficients of variation were computed for each genre category.[9] Table 2 presents the descriptive statistics used in these computations. Based on these coefficients, the following ranking of riskiness (from most risky to least risky) emerged: ACTION, DRAMA, COMEDY. The risk premium argument would predict that the size of the fixed payment to the risk-averse actor will be largest for an ACTION film, then for a DRAMA, and then for a COMEDY. With real fixed payment as the dependent variable, the coefficients of ACTION, DRAMA, and COMEDY, should be positive, centered around zero, and negative, respectively.

Seasonality of Release

Whether a film is released during an off season or a holiday season should impact the actor's assessment of the riskiness of a film project. For the purposes of this analysis, the off season is defined as either the spring or fall season (January 16-May 15 or August 16-November 15), and a holiday or prime season is defined as either the summer or winter season (May 16-August 15 or November 16-January 15). The rationale for these seasonal subdivisions is that the prime season includes the major industry holidays, in terms of expected revenues (Memorial Day, Christmas, Thanksgiving, and the Fourth of July), while the off season does not. While there is evidence which suggests that the release dates for films can change as the date approaches (Chisholm (1994b)), the final release date appears to fall within a relatively close proximity of the original projected release date. Since the definitions of these two categories are sufficiently broad, they should pose no problem with respect to the potential endogeneity of the release decision.

Based on the coefficients of variation across seasons, presented in Table 2, releasing a film in an off season was found to be more risky than releasing one in a prime season.[10] A risk-averse agent will require a larger risk premium to participate in a film slated for release in an off season versus a prime season. The variable OFFSEASON equals one if the film is released during the off season, and zero otherwise. Therefore, OFFSEASON should be positively related to the size of the real fixed payment to the actor.

Actor's Experience

The less experienced the actor, the more risky the project will appear *ex ante*. The actor may have some private information about his potential talent, but he will still expect there to be a relatively high degree of uncertainty surrounding the expected success of the current film project. To alleviate a portion of the risk borne by the actor, a higher risk premium should be offered the less experienced the actor.

IV. EMPIRICAL ANALYSIS

The empirical analysis of the implications described in Section IV involves an OLS estimation of the following equation, in which the dependent variable, FIXEDPAY, represents the real fixed payment to the actor:

$$FIXEDPAY_i = \beta_1 + \beta_2 TREND_i + \beta_3 SEQUEL_i + \beta_4 COMEDY_i + \beta_5 DRAMA_i + \beta_6 OFFSEASON + \beta_7 ACTEXP + \varepsilon_i \quad \text{EQ-1}$$

The TREND variable is included to capture changes in riskiness over time, or simply to control for real increases in the fixed component of share contracts during the period of analysis, 1959-1989. The results of this analysis are presented in Table 3; a discussion of these results follows.[11]

Refutation of Risk Premium Hypothesis

The maintained hypothesis throughout the previous section has been that a risk-neutral producer offers a risk-averse actor a two-part contract, and that the fixed portion of the actor's contract serves as a risk premium. The results in Table 3 do not support this hypothesis. The theory predicts that since a sequel is a less risky venture, the risk premium for such a film should be relatively small. The sign on the SEQUEL variable should, therefore, be negative. This variable was insignificant, and positive.

None of the genre variables were significant predictors of the size of the fixed payment to the actor. Since the DRAMA coefficient was predicted to be centered around zero, this prediction was not refuted. However, the ACTION variable should be positive, while the COMEDY variable should be negative. While these coefficients did achieve the correct signs, the results were insignificant.[12]

Since an off season is a more risky time to release a film than a prime season, we would expect the actor to be compensated with a higher risk premium in such cases, as compared to a prime season release. The sign on the OFFSEASON coefficient should be positive; however, the estimation of Equation 1 led to a negative and insignificant coefficient on this variable.

If a film is more risky with a less-experienced actor, then a risk-averse actor should be more likely to receive a larger fixed payment than a veteran actor. While the sign of the coefficient on ACTEXP was positive, as the risk-premium theory would predict, it was insignificant. Note that this subsample involved a selection bias in the direction of over-representing actors with more experience. This would tend to bias the coefficient on ACTEXP

upward. Therefore, the sign of the coefficient may, in fact, be closer to zero, or perhaps negative.[13]

Alternative Risk Averseness Assumptions

In Section IV, the actor was assumed to be risk averse, while the producer was assumed to be risk neutral. Under these assumptions, the results in Table 3 do not support the risk-premium argument as explaining the size of the fixed payment. How well do alternative assumptions regarding risk neutrality hold up to the data?

Consider the case in which the producer is more risk averse than the actor. In this case, the producer will realize that the actor will need to be accommodated on the risk margin, but in all cases in which the actor would require a risk premium, so would the producer, and to an even greater extent. The implications, therefore, would be the same, regarding the signs of the coefficients presented in Section IV. However, when those predictions incorporate the risk averseness of the producer, those predictions are weakened. In fact, if the producer is sufficiently more risk averse than the actor, in the extreme, the actor will receive no risk premium. While this assumption about the relative risk averseness of the producer and actor is more consistent with the results presented in Table 3, the logical extreme implies that actors should not receive any risk premia. Note further that if the actor and producer are both risk neutral, then the fixed portion of the share contract would certainly not be explained by risk-sharing concerns.

V. CONCLUSIONS

Data on motion-picture share contracts with fixed payments refute the hypothesis that the fixed portions of these contracts serve as risk premia for risk-averse actors. The question remains: Why do these share contracts include any sort of fixed payment? Perhaps the movie producer is liquidity constrained in the short run, and can only offer the actor a portion of his total payment upfront, otherwise the film could not be produced.[14]

Perhaps the fixed payment plays the role of guaranteeing that the actor receive his reservation level of utility, to ensure that he will perform in the film at all. This explanation would be consistent with a basic tenet of the principal-agent literature. Furthermore, while the evidence suggests that the real size of the fixed payment is not explained by the risk-premium hypothesis, the size of the payment *relative* to the expected value of the income from the share component of the contract may be positively related to the riskiness of the project. While the present data set is not suited to testing these hypotheses directly, they are promising avenues of research which may lead to further illuminating the motivations involved in two-part contract design.

TABLE 1

Descriptive Statistics

Comparison of Sample to Subsample

	Mean		Standard Deviation	
Variable	Sample	Subsample	Sample	Subsample
ACTION	0.22881	0.22857	0.42186	0.42604
COMEDY	0.32203	0.22857	0.46925	0.42604
DRAMA	0.44915	0.54286	0.49953	0.50543
SEQUEL	0.11864	0.11429	0.32475	0.32280
OSCAR	1.9661	3.2000	2.7267	3.1041
ACTEXP	17.314	23.543	15.170	15.112
TEAM	0.27723	0.39394	0.44986	0.49620
PASTREV	0.39429E+08	0.46179E+08	0.52159E+08	0.47776E+08
TREND	1975.1	1973.7	9.0088	8.5472

Sample size: 118 observations
Subsample size: 35 observations

TABLE 2

Coefficients of Variation in Real Revenue

Genre and Season

Variable	Number of Observations	Mean	Standard Deviation	Coefficient of Variation
		Genre		
Action	10	0.44328E+08	0.56918E+08	128.4019
Comedy	23	0.16484E+08	0.10787E+08	65.43921
Drama	37	0.52368E+08	0.61793E+08	117.9976
		Season		
Offseason	40	0.37487E+08	0.42536E+08	113.4687
Primeseason	43	0.50022E+08	0.38506E+08	76.97813

TABLE 3

OLS Estimation of Risk Premium Explanation for

Real Upfront Payments

Variable	Coefficient	t-ratio
CONSTANT	-0.30029E+07	-3.501***
TREND	1531.5	3.521***
SEQUEL	11595.0	1.016
COMEDY	-6118.4	-0.575
DRAMA	-3189.2	-0.308
OFFSEASON	-2834.4	-0.369
ACTEXP	196.45	0.817

R^2 .4434867
Adjusted R^2 .2992054
Durbin-Watson 1.4265981
Sample size 35 observations
Significant at the 1% level***

Endnotes

1. See Hayami and Otsuka (1993) at 24 for the mathematical representation of these three general cases of share contracts.

2. The sharecropping literature includes: Cheung (1969, 1983); Stiglitz (1974); Barzel (1989); and Hayami and Otsuka (1993).

3. For recent contributions to the principal-agent literature, following Holmström (1979, 1982), see: Dutta and Radner (1991); Khalil and Lawarrée (1993); Haubrich (1994); and Baker (1994).

4. Recent empirical contract research includes: Masten (1984); Crocker and Masten (1988); Leffler and Rucker (1991); LaFontaine (1992); Allen and Lueck (1992, 1993); Crocker and Reynolds (1993); and Chisholm (1994a).

5. The choice of a share contract (with or without a known fixed component) versus a fixed payment, in motion-pictures contracts, was explained most strongly by the moral-hazard argument in Chisholm (1994a); the data in that analysis provided only weak support of the risk-sharing explanation for that choice.

6. See Chisholm (1994a) for a detailed description of the entire data set.

7. A share payment is defined as a payment involving a percentage of either the net or gross revenues generated by a film. Three of the films in this subsample, involving a total of five contracts, included additional compensation information, aside from the fixed payment and the share payment. In one case, the *ex ante* terms included additional weekly pay in the case that the film took longer to shoot than predicted; in one film, the shares would only be paid out after the gross revenues reached a specified percentage of "negative costs"; in another case, an actor received 10% of the net revenues, then 15% of the gross revenues after the film broke even. In all cases, these observations were treated as share contracts, with fixed payments.

8. The variables presented in Table 1 are defined as follows. The genre variables equal one if the film associated with a given contract falls into that category (ACTION, COMEDY, DRAMA). The SEQUEL variable equals one if the film is a sequel. The OSCAR variable represents the degree of Oscar recognition the actor received prior to the current film; it includes both Oscar nominations and Oscar receipts. The ACTEXP variable measures the number of feature-length films in which the actor had a principal or lead role prior to the current film. The TEAM variable equals one if the actor and producer worked together in the past. The PASTREV variable represents the real revenue generated by the actor's most-recent film, with *Variety* being the primary source for revenue data. The TREND variable represents the year in which the film was released.

9. The data source employed for this risk analysis included the revenues and genres of the most-recent films of the actors in the larger data set, analyzed in Chisholm (1994a). An alternative source of data for the genre/revenue relationship led to the same ranking of riskiness.

10. An alternative source of revenues and release dates led to the same ranking of riskiness on the seasonality margin.

11. Note that the ACTION dummy variable is the omitted variable, implicitly subsumed in the CONSTANT term, since genre is divided into three categories.

12. When the ACTION variable was explicitly included in the analysis, its sign was positive but insignificant. An additional OLS estimation was performed, adding the variable SWITCH, which equalled one if the current film genre was a switch of genre from the actor's most recent film. The risk argument would suggest that the project would appear more risky if the actor was switching genres, than if he was staying with the more-reliable recent genre. When this variable was included, the OLS results did not change significantly, and the SWITCH variable was not a significant predictor of the size of the real fixed payment.

13. Note that the two variables that are significant in this regression are CONSTANT and TREND. The significance of the CONSTANT term, coupled with the low adjusted R^2, suggest that missing variables, unrelated to the riskiness of the project, are driving the size of the fixed payment. The significance of the TREND variable may simply reflect real increases in actors' salaries over time.

14. This argument is posed in Paul and Kleingartner (1994).

APPENDIX

List of Actors and Actresses in

OLS Regression Table 3

Marlon Brando
Richard Burton
Sean Connery
Bette Davis
Clint Eastwood
James Garner
Audrey Hepburn
Dustin Hoffman
William Holden
Jack Lemmon
Shirley MacLaine
James Mason
Steve McQueen
Paul Newman
Jack Nicholson
Al Pacino
Robert Redford
Burt Reynolds
George C. Scott
George Segal
Simone Signoret
Sylvester Stallone
Elizabeth Taylor
John Travolta
David Warner
John Wayne

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